

# PIG PARASITES AND THUMPS

By B. H. RANSOM,

Chief, Zoological Division, Bureau of Animal Industry.

**A**TEN DAY TOUR through the body, from the intestine to the lungs and back again, is the strange trip taken during its early life by the common intestinal roundworm of the pig. The recent discovery of this habit of the young parasite has led to another interesting discovery, that if many of the worms go on their travels at the same time, the result to the animal whose lungs are thus invaded is often disastrous. The roundworm in question, which bears the name of *Ascaris lumbricoides*, is one of the most injurious parasites of pigs and has long been recognized by swine breeders as a troublesome pest, causing digestive troubles, interfering with growth, and impairing health, especially in young animals. It is also of common occurrence in human beings, particularly children.

## Eggs Hard to Spoil.

The adult worms (fig. 1, *A*) live in the small intestine. The female, measuring when full grown a foot or more in length, produces millions of eggs of microscopic size, which pass out of the body of the infested pig or human being in the intestinal excreta. These eggs are provided with thick, impermeable shells and are endowed with remarkable vitality, so that they can withstand severe cold, dryness, and most chemical disinfectants. They have been known to remain alive as long as five years.

When the eggs reach the outer world they are in an early stage of development and are not infectious if taken

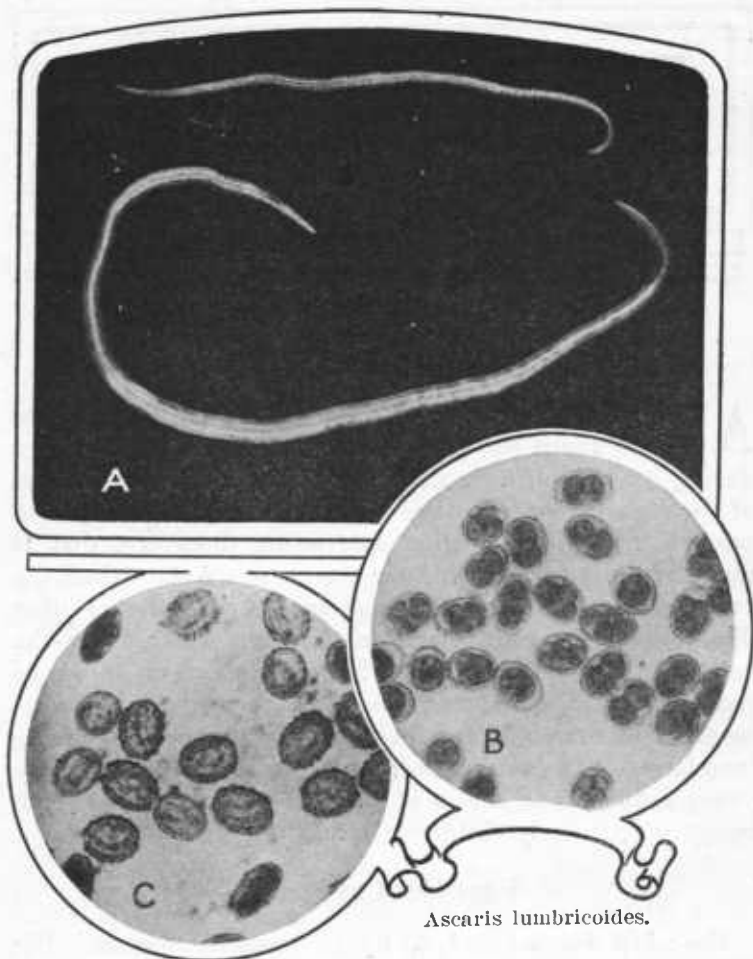


FIG. 1.—A, Adult intestinal worms of the pig. Larger one, female; smaller one, male. About one-half natural size. B, Eggs in early stages of development. Magnified 150 times. C, Eggs containing embryonic worms. Magnified 150 times.

into the body of a pig or a human being (fig. 1, *B*). In a few weeks, however, if temperature and moisture conditions are favorable, a tiny worm develops within the eggshell, and the egg becomes infectious (fig. 1, *C*). If the egg should then be swallowed it hatches after reaching the small intestine, and the young worm is ready for its 10-day journey.

### Taking a Trip and Growing.

Formerly it was supposed that the worm after hatching simply settled down in the intestine and continued its development, but as a result of recent investigations by Lieut. Col. Stewart, of the Indian Medical Service, by Prof. Yoshida, of Osaka University, Japan, and by Mr. Foster and the writer, of the Bureau of Animal Industry, it is now known that the young parasite makes a circular tour—a sort of home-seeker's trip—through the body of the pig. After hatching, the young worm, which at this time measures less than one one-hundredth of an inch in length, promptly leaves the intestine, gets into the blood vessels, and is carried first to the liver and then to the lungs (fig. 2), passing through the heart on the way. In the lungs it spends a number of days, but soon passes up the windpipe into the pharynx and then down the esophagus or gullet into the stomach and at last into the small intestine. This journey



The Parasite in a Lung.

FIG. 2.—Young intestinal worm in lung one week after infection. Highly magnified.

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from the intestine to the lungs and again into the intestine usually requires about 10 days. Meanwhile the worm has grown considerably, and when it leaves the lungs and returns to the intestine it is nearly ten times as long as when it first hatched, although it is still too small to be seen without a microscope, and has yet to undergo an enormous growth before it is fully developed. It reaches maturity in about two and one-half months, including the time spent on its journey to the lungs and back again into the intestine.

### “Thumps.”

In passing through the lungs the young worms cause small hemorrhages, and if numerous they give rise to pneumonia, which may prove fatal. Moreover, it has been observed that pigs which survive the stage of lung infection often fail to grow and develop properly, and remain small, stunted, and unprofitable (fig. 3). The symptoms shown by pigs whose lungs have been invaded by these worms are commonly known as “thumps.” There are other causes of “thumps,” which is a term loosely applied to almost any condition in pigs in which there is difficult breathing, but invasion of the lungs by young intestinal roundworms is one of the most frequent causes. Similar disturbances of respiration occur in human beings in the early stage of roundworm infection, and it is probable that some of the obscure lung troubles of children will be found to have the same basis as parasitic “thumps” in pigs.

Pigs as they become older become more resistant to infection by the intestinal roundworm and also are less likely to suffer seriously from the lung stage of the parasite.

### How to Prevent Losses.

The newly discovered facts that have been mentioned not only show that the common intestinal roundworm is a more dangerous parasite than formerly supposed, but also help to show how the damage it does may be avoided.

Because of its great prevalence among hogs, and because its eggs in hog yards and pastures are so long-lived, complete eradication of the parasite is a difficult matter and not likely to be accomplished on most farms. It is readily pos-

sible, however, to manage in such a way as to eliminate the serious losses that often occur as a result of *Ascaris* infection. In short, the problem resolves itself largely into that of proper protection to young pigs until they have reached an age at which they are no longer likely to suffer serious injury even though they become infected.

Accordingly, clean and sanitary farrowing pens should be provided, into which the sows are placed a few days before farrowing. Mud and dirt from long-used hog yards and wallows, likely to be heavily laden with infectious *Ascaris*



Growth Is Stunted by Parasites.

FIG. 3.—A, Three pigs about 4 months old from the same herd. The two small pigs, weighing 12 and 15 pounds each, show the effects of severe *Ascaris* infestation. The large pig, which has escaped serious injury by *Ascaris*, weighs 90 pounds. B, Three pigs from the same litter, about 4 months old. When a few weeks old the small pig in the middle was artificially infected with *Ascaris* eggs, as a result of which it passed through an attack of thumps. Originally of about the same weight as either of the other two, this pig, though kept with the others on the same feed, failed to grow as well. At the time the picture was taken the small pig weighed 45 pounds and the large pigs 100 pounds each.

eggs, should be cleaned from the skin, especially from the udder, before the sows enter the farrowing pens.

From the farrowing pens the sows and pigs are transferred to fields or pastures that are as free as possible from infection, and until the pigs are about 3 months old they are rigidly excluded from permanent hog yards and pastures and other places likely to be badly contaminated with the droppings of hogs.

Essentially the plan consists in providing a clean place for farrowing and in excluding young pigs from polluted pens and pastures. It has been tried with excellent results on a number of farms in the Middle West. On some of them, where formerly a considerable percentage of the pig crop was lost, there have been practically no losses since this simple plan of sanitation was adopted. From the experience gained in the practical tests that have been made of improving the sanitary conditions under which pigs are reared, based upon our newer knowledge of the intestinal roundworm, it is evident that with comparatively little effort, understandingly applied, on the part of the swine raisers, tremendous savings can be made in the pork production of the Nation, and added security given to an industry from which already much of the hazard has been removed by the application of the results of investigation of other swine diseases.

Thus, in this instance, as in many others, scientific research has pointed the way toward the elimination of destructive waste from disease among live stock as well as among human beings, and has again demonstrated its importance as a factor in agricultural progress.